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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/577,866	10/03/2006	Alexander A. Khromykh	252007	2237

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EXAMINER	
BOESEN, AGNIESZKA	

ART UNIT	PAPER NUMBER
1648	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/577,866	KHROMYKH ET AL.	
	Examiner	Art Unit	
	Agnieszka Boesen	1648	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 February 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-37* is/are pending in the application.

4a) Of the above claim(s) *1-16 and 30-37* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *17-29* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *10/3/2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

This Non-Final Office Action is responsive to the communication received February 29, 2008.

Election/Restrictions

Applicant's election with traverse of group II claims 17-29 is acknowledged.

Applicant argues that the restriction between the claims of group I and II is improper because the nature of the claims is such that any burden encountered in searching and examining two groups of claims at the same time would not be serious. In response to Applicant's arguments it is the Office position that searching the claims of group II and I together would require a separate search and would be an undue burden on the Office since the claims of group I are drawn to an immunotherapeutic composition comprising Kunjin virus comprising a number of attenuating mutations and the claims of group II are broadly drawn to methods of immunizing an animal comprising administering Kunjin virus. Searching the methods claims may not necessarily reveal literature disclosing specific attenuating mutations recited in the claims of group I. Thus a separate search would be required in order to search the limitations of claims of group I. Additionally the present claims lack unity of invention as discussed in the restriction requirement of November 2, 2007. The restriction requirement is thus deemed proper and is made FINAL. Claims 1-16, and 30-37 are withdrawn because the claims are drawn to the non-elected invention.

Information Disclosure Statement

The information disclosure statement (IDS) submitted on 10/3/2006 is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement has been considered by the Examiner.

Claim Interpretation

Claims are drawn to a method of immunizing an animal including the step of administering an isolated nucleic acid capable of producing an infectious Kunjin virus to said animal, wherein the isolated nucleic acid corresponds to substantially an entire genome of a Kunjin virus. Based on the definition of the recitation of: "substantially the entire genome" in the specification, it is understood that the metes and bounds of phrase "substantially" require that when the nucleic acid substantially corresponds to substantially entire genome the Kunjin virus will have the capability to replicate.

[0052] In light of the foregoing, it will be understood that "substantially the entire genome" encompasses isolated nucleic acids having minor deletions or sequence alterations with respect to the Kunjin virus genome that do not significantly reduce the ability of the isolated nucleic acid to produce infectious virus.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 17 and 18 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for the method **of inducing an immune response** an animal comprising administering an isolated nucleic acid capable of producing an **attenuated Kunjin**

virus to said animal (or a Kunjin virus comprising at least one attenuating mutation), does not reasonably provide enablement for the method of **immunizing an animal** comprising administering an isolated nucleic acid capable of producing an **infectious Kunjin virus**. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to practice the invention commensurate in scope with these claims.

Claims are drawn to a method of immunizing an animal including the step of administering an isolated nucleic acid capable of producing an infectious Kunjin virus to said animal. The claims are rejected because the skilled artisan would be unable to practice the claimed method with a reasonable expectation of success using non-attenuated Kunjin virus that would cause a disease in a subject.

In making a determination as to whether an application has met the requirements for enablement under 35 U.S.C. 112 ¶ 1, the courts have put forth a series of factors. See, In re Wands, 8 USPQ2d 1400, at 1404 (CAFC 1988); and Ex Parte Forman, 230 U.S.P.Q. 546 (BPAI 1986). The factors that may be considered include (1) the quantity of experimentation necessary, (2) the amount of direction or guidance presented, (3) the presence or absence of working examples, (4) the nature of the invention, (5) the state of the prior art, (6) the relative skill of those in the art, (7) the predictability or unpredictability of the art, and (8) the breadth of the claims. Id. While it is not essential that every factor be examined in detail, those factors deemed most relevant should be considered. In the present case, the factors deemed relevant are those of the amount of direction and the working examples provided, that quantity of experimentation necessary, the (un)predictability of the art, and the breadth of the claims.

The claims are broadly drawn to the method of immunizing an animal. The term "immunizing" is interpreted to mean "vaccinating". Vaccinating implies that a protective immune response in an animal must be induced, and protect an animal due to challenge with the West Nile virus. The specification discloses that mice vaccinated with the present composition are protected against West Nile virus strain NY99. However the claims broadly encompass protection of humans against any flaviviruses. The specification does enable the full scope of the claims, because the specification does not provide working examples showing pritection in humans and other subjects encompassed by the claims due to immunization with the present composition. Thus it is determined that the present claims are enabled for the method of vaccinating mice against NY99 strain, however the claims are not enabled for the full scope as claimed..

Kunjin virus is closely related to West Nile virus and the genomes of both viruses show a high degree of homology. Kunjin virus has been shown to cause disease and even death in infected humans (see Briese et al. The Lancet, 1999, Vol. 354, p. 1261-1262). Attenuated Kunjin virus genome has been used to produce virus like particles and replicons for delivery of heterologous nucleic acid and generation of immune responses against HIV and other pathogens (see Harvey et al. Journal of Virology, 2003, p. 7796-7803). Examples 1 and 2 of the specification show immunization of mice with an attenuated Kunjin virus. The skilled artisan would be motivated to provide an attenuated Kunjin virus genome for the purposes of generation of an immune response because attenuation would ensure that the Kunjin virus DNA would not cause a disease when administered to a subject. Thus because the present claims broadly encompass a method of immunizing an animal comprising administering an infectious Kunjin

virus which may cause an infection and possibly death in an animal, and because art teaches that the Kunjin virus should be attenuated when used for the purposes of immunization, it is determined the present claims are not fully enabled.

Thus in view of the breadth of the claims and in view of the teachings of the art, and the examples in the specification it is determined that the skilled artisan would be unable to practice the full scope of the claimed method with a reasonable expectation of success.

Biological Deposit Requirement

Claim 25 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

It is apparent that West Nile Virus strain NY 99 is required to practice the claimed invention because it is a necessary limitation for the success of the invention as stated in the claims. As a required element it must be known and readily available to the public or obtainable by a repeatable method set forth in the specification, or otherwise readily available to the public. If it is not so obtainable or available, the enablement requirements of 35 U.S.C. § 112, first paragraph, may be satisfied by a deposit of West Nile Virus strain NY 99. See 37 CFR 1.802. The specification does not provide a repeatable method for producing the West Nile Virus strain NY 99 and the said WNV strain does not appear to be readily available material.

Deposit of West Nile Virus strain NY 99 in a recognized deposit facility would satisfy the enablement requirements of 35 U.S.C. 112., because the strain would be readily available to the public to practice the invention claimed, see 37 CFR 1.801- 37 CFR 1.809.

If a deposit is made under the terms of the Budapest Treaty, then an affidavit or declaration by applicants or someone associated with the patent owner who is in a position to make such assurances, or a statement by an attorney of record over his or her signature, stating that the deposit has been made under the terms of the Budapest Treaty and that all restrictions imposed by the depositor on the availability to the public of the deposited material will be irrevocably removed upon the granting of a patent, would satisfy the deposit requirements. See 37 CFR 1.808.

If a deposit is not made under the terms of the Budapest Treaty, then an affidavit or declaration by applicants or someone associated with the patent owner who is in a position to make such assurances, or a statement by an attorney of record over his or her signature, stating that the deposit has been made at an acceptable depository and that the following criteria have been met:

(a) during the pendency of this application, access to the invention will be afforded to one determined by the Commissioner to be entitled thereto;

(b) all restrictions imposed by the depositor on the availability to the public of the deposited material will be irrevocably removed upon granting of the patent;

(c) the deposit will be maintained for a term of at least thirty (30) years and at least five (5) years after the most recent request for the furnishing of a sample of the deposited material;

(d) a viability statement in accordance with the provisions of 37 CFR 1.807; and

(e) the deposit will be replaced should it become necessary due to inviability, contamination or loss of capability to function in the manner described in the specification.

In addition the identifying information set forth in 37 CFR 1.809(d) should be added to the specification. See 37 CFR 1.803 - 37 CFR 1.809 for additional explanation of these requirements.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 17-29 are rejected under 35 U.S.C. 102(a) as being anticipated by Hall et al. (PNAS, September 2, 2003, Vol. 100, p. 10460-10464 in IDS of 10/03/2006).

Hall et al. disclose a method of immunizing mice comprising administering attenuated full length RNA genome of Kunjin virus. Hall et al. disclose that immunization of mice with attenuated Kunjin virus elicits a protective immune response to West Nile virus strain NY99 (see the entire document, particularly Materials and Methods, Result and Table 3). The nucleic acid encoding Kunjin virus comprises at least one attenuating mutation and the nucleic acid is a DNA operably linked to a promoter and expressed in a mammalian cell (see Cell Culture and Virus

Preparation and Plasmid DNA Constructs, pages 10460-10461). Hall et al. disclose that his attenuated Kunjin virus vector can be used for vaccination purposes of humans, equine and other veterinary animals to prevent outbreaks of West Nile virus (see Discussion). It is noted that the claims are rejected for the enabled use of inducing an immune response.

Thus by this disclosure Hall et al. anticipate the present claims.

Claims 17-23, 26, and 28 are rejected under 35 U.S.C. 102(e) as being anticipated by Westaway et al. (US Patent 6,893,866).

The applied reference has a common inventor with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

Westaway disclose a method for immunizing an animal comprising administering an attenuated Kunjin virus replicon comprising a nucleotide encoding HCV proteins (HCV belongs to flavivirus family) (see claims 21-37, and Examples 1-3, and Example 8). The isolated nucleic acid encoding the genome of Kunjin virus is operably linked to a promoter and is expressed in a mammalian cell (see Examples 1-3, and column 10, lines 12-30). It is noted that the claims are rejected for the enabled use of inducing an immune response.

Thus by this disclosure Westaway et al. anticipate the present claims.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 17-24, 26-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Anraku et al. (Journal of Virology, April 2002, p. 3791-3799).

Anraku et al. teach a method of immunizing an animal comprising administering a nucleic acid encoding an attenuated Kunjin virus genome comprising nucleic acids encoding foreign heterologous epitopes (see the entire document). Anraku et al. teach nucleic acid encoding Kunijn virus genome operably linked to a promoter and expressed in a mammalian cell (see Materials and Methods). Anraku et al. teach using Kunjin virus replicons for generation of immune response against CTL epitopes of cytomegalovirus, LCMV virus, and *Plasmodium berghei*. (see page 3795). Anraku et al. do not teach generating immune responses to at least another flavivirus by administration of Kunjin virus replicons. However Anraku et al. teach that Kunjin virus replicons have been shown to be effective vaccine vectors for induction of protective immune response against HIV and other viral pathogens (see Discussion).

Thus in view of Anraku's teaching, it would gave been obvious to incorporate immunogenic epitopes of other flaviviruses, such as for example HCV or West Nile virus in the Kunjin virus replicons and use Kunjin virus replicons for generation of immune responses against infection with HCV or West Nile virus. It would have been obvious to generate immune

responses to a West Nile virus in a human, equine, and avian species because it is well known in the art that West Nile virus infects humans, equine and avian.

One would have had a reasonable expectation of success to generate immune responses against West Nile virus comprising administering Kunjin virus replicon with or without epitopes from West Nile virus, because Kunjin and West Nile virus are both flaviviruses, sharing a high degree of homology, and therefore it would have been expected that Kunjin virus replicon will generate antibodies cross-reactive between Kunjin and West Nile virus. It is noted that the claims are rejected for the enabled use of inducing an immune response.

Thus the present invention would have been *prima facie* obvious at the time when the invention was made.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 17-29 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 29-31 of copending Application No. 10/559,146. Although the conflicting claims are not identical, they are not patentably distinct from each other because the present claims and the copending claims are drawn to methods of immunizing an animal comprising administering an isolated nucleic acid producing Kunjin virus.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Agnieszka Boesen whose telephone number is 571-272-8035. The examiner can normally be reached on Monday through Friday from 9:00 AM to 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bruce Campell can be reached on 571-272-0974. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Agnieszka Boesen, Ph.D./
Examiner, Art Unit 1648

/Stacy B Chen/
Primary Examiner, Art Unit 1648